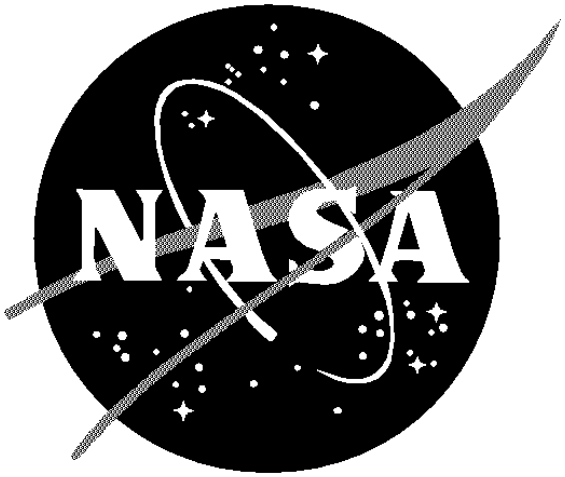

National Aeronautics and Space Administration

May 8, 1997

CAN-97-MTPE-01

A COOPERATIVE AGREEMENT NOTICE

Creative and Innovative Working Prototype Earth Science Information Partnerships in Support of Earth System Science

A Cooperative Agreement Notice for the Earth Observing System Program

Letters of Intent Due June 11, 1997
Proposals Due July 14, 1997 by 4:30 p.m. (EST)

PREFACE

Creative and Innovative Working Prototype Earth Science Information Partnerships in Support of Earth System Science

This NASA Cooperative Agreement Notice (CAN) solicits proposals from all sources for Working Prototype Earth Science Information Partners (WP-ESIPs). Through this solicitation and award process, NASA seeks to support and stimulate public purposes authorized by law; namely, to invigorate the EOS community and encourage it to explore and demonstrate alternate ways for ensuring the Earth Observing System Data and Information System (EOSDIS) provides the most valuable, current Earth science data to the research community in a cost-effective, innovative, and useful manner. Ultimately, the EOSDIS fulfills the broad public purpose of empowering new levels of achievement in earth sciences and applications, and in a wide range of activities in both the public and private sectors. Although NASA currently manages the EOSDIS through the efforts of civil servants and contractors, the National Research Council (NRC) has recommended that the Agency shift appropriate functions to a Federation of competitively selected Earth Science Information Partners (ESIPs). As discussed more fully below, NASA endorses this concept, but first needs to identify potential ways that ESIPs can perform EOSDIS functions in a more open, cost-effective, and user-focused manner. While the potential benefits are great, there are also serious risks associated with transferring major scientific functions outside the Government. Recognizing NASA's continuing responsibility to make the EOSDIS more useful to and integrated with its users while continuing to ensure that EOSDIS operates fairly and provides the highest levels of support to the diverse interests of the research community, the Agency will evaluate potential revisions in phases. This CAN begins the first phase of identification, demonstration, and validation of technical approaches that could be used to transition major EOSDIS functions to a Federation of ESIPs. The solicitation leaves much of the details on how to make this transition successful and, in the end, largely self-sufficient, to proposers to design and describe in their submissions. In the sections which follow, this CAN describes more fully the objectives and goals to be supported through this process, the evaluation factors and process to be employed, and the outcome expected. Until this CAN and the demonstrations to follow are complete and their results analyzed, NASA will continue its efforts to perform all EOSDIS functions, as previously described. Nothing in this CAN should be interpreted as an attempt to shift any specific function or task to the recipient[s] of cooperative agreement[s] which may result from this solicitation, or as an indication that NASA's current plans for the EOSDIS are no longer valid or appropriate.

NASA plans to initiate the Federation of ESIPs through an evolutionary, prototyping process, starting with a Working Prototype Federation (WP-Federation) of Working Prototype ESIPs (WP-ESIPs). The objective of the WP-Federation is to experiment with and evolve processes to make Earth system science data easy to preserve, locate, access and use for all beneficial applications, including research, education, and commercial, many of which may cross the Federation membership. NASA has developed a high-level model for federation though careful thought and the advice of scientists NASA involved in an eight-month study carried out by a NASA-led Response Task Force. NASA concluded that the issues of federation governance and interoperability would be best resolved experimentally using a WP-Federation. The NRC is also developing further information concerning the governance issue identified in the original recommendation. In addition, NASA has asked the NRC to convene a forum to air the issues surrounding the essential functions of federated information systems for environmental data.

The development and evolution of these approaches as a result of a participatory process of the environmental information communities is expected to contribute to the emergence of an effective Environmental Information Economy providing for the routine exchange of environmental data and information and to the National Information Infrastructure. Through this CAN, NASA intends to stimulate the competitive environment for meeting future science needs, by seeding the community

with more experienced providers capable of competitively supplying valuable environmental information products and services.

NASA has concluded that ESIPs can best be described as belonging to three types. Type 1 ESIPs are responsible for standard data and information products whose production, publishing/distribution, and associated user services require considerable emphasis on reliability and disciplined adherence to schedules. Type 2 ESIPs are responsible for data and information products and services in support of Earth system science (other than those provided by the Type 1 ESIPs) that are developmental or research in nature, where emphasis on flexibility and creativity is key to meeting the advancing research needs. Type 3 ESIPs are those providing data and information products and services to users beyond the global change research community who enter into joint endeavor agreements with NASA Mission to Planet Earth (MTPE).

This CAN solicits proposals only from those wishing to be **Type 2 WP-ESIPs**, to be a part of the WP-Federation and to provide information products and services in support of Earth system science. A companion CAN solicits proposals for Type 3 WP-ESIPs. Given the ever-changing and progressive nature of the research process, scientific and technical innovation, flexibility, and creativity are to be the hallmarks of Type 2 ESIPs. The Type 2 WP-ESIPs are to provide user services to all on a non-discriminatory basis at no more than the marginal cost of fulfilling user requests. In all cases, priority will be given to efforts where the technologies and approaches proposed offer significant opportunities for contributing to the emerging concept of a federated network of environmental data and information providers and users. NASA funding will be provided only for new or qualitatively expanded activities which are expected to enhance innovation and creativity in the areas of accessibility of environmental information services and not for continuing on-going operations of the proposers.

As *working* prototypes, Type 2 WP-ESIPs are expected to deliver real services to real users, recognizing that the reliability and availability of these services may be limited because the ESIPs are still in an exploratory stage of development. All those proposing to this CAN must identify (1) innovative Earth system science products and/or services, (2) new or emerging information technologies and approaches which will be tested through working prototype approaches, and (3) user support for a broad or targeted user community. NASA is seeking teams which involve researchers, information scientists and technologists, and practical systems managers and implementers.

We appreciate your interest and cooperation in responding to the "Creative and Innovative Working Prototype Earth Science Information Partnerships in Support of Earth System Science" NASA Cooperative Agreement Notice.

W.F. Townsend
Acting Associate Administrator for Mission to Planet Earth

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Appendix A Program/Technical Description

Section 1 Program Scope

This Cooperative Agreement Notice (CAN) solicits proposals for cooperative partners to participate in prototyping alternate ways to develop, produce, and publish/distribute environmental information and to provide associated user services in support of Earth system science research and applications. Throughout this CAN, the term Earth system science is broadly used to define a science that deals with understanding the entire Earth system on a global scale by describing how its component parts and their interactions have evolved, how they function, and how they may be expected to continue to evolve on various timescales. The intent of this solicitation is to explore with the community new and innovative approaches to NASA's Earth Observing System Data and Information System (EOSDIS) and its support of Earth system science, and to contribute to the implementation of an increased functionality for environmental data and information search, access, order, and retrieval as part of the emerging National Information Infrastructure.

Presently, NASA is relying on a traditional experience base of government civil servants and contractors to develop and to support the functionality expected to be provided by the EOSDIS in the next several years, incorporating new technologies, as they mature, into the evolutionary system. The production, distribution, and user services are being provided by a set of non-competitively selected Distributed Active Archive Centers (DAACs), consisting of NASA centers, other agencies' data centers and universities. The requirements for the support of Earth system science have been developed and recommended over many years by the research community and published in a variety of scientific journals and reports. In order to facilitate the engagement of the scientific community in the interactive analyses necessary to understand how the planet functions, environmental information products and/or services must be made available to the research community based on a user-centered design methodology.

The Internet and such services as the World Wide Web are popular and rapidly-growing technologies that provide vast quantities of information to the public. In addition, new information technologies relevant to the area of environmental research are being developed and made commercially available. The identification and demonstration of practical applications of advanced, emerging information technologies for efficient implementation and the development of scaleable systems are needed in order to be able to transfer appropriate EOSDIS functions outside government, and to better integrate the EOSDIS into the National Information Infrastructure.

Production of geophysical information from large volumes of environmental data with sophisticated algorithms and intensive processing needs, information search and order, distribution using a variety of media and network technologies, and user services are the major functions presently supplied by the DAACs with technologies being procured through government contracts. Through this CAN, NASA intends to stimulate the environment for meeting future science needs, by seeding the community with more experienced providers capable of supplying valuable environmental information products and services. NASA MTPE, if the WP-Federation experiment proves successful, intends to obtain its standard data production through a competitive process and join in a full Federation.

Scientists of the future will be both producers and users of data - from their desktops. This long-term vision is perhaps the impetus for the NRC idea of Federation. The move to interdisciplinary Earth science interests is expected to lead increasingly to innovative, multi-sensor and multi-source product generation for both science and applications. An enterprise model to best facilitate the

public availability (including intermediate availability of multi-source products to higher-level data producers) of data and information from these geographically-dispersed providers is needed to effect the emergence of an Environmental Information Economy capable of providing for the routine exchange of environmental data and information, enhancing the National Information Infrastructure. This CAN refers to an Environmental Information Economy as the collective enhancements needed within the National Information Infrastructure, which also may imply a concerted agreement and evolution process within the community of environmental information providers and users.

NASA intends the Cooperative Agreements engendered by this CAN to shorten the development time of an effective and useful Environmental Information Economy by increasing the acceptable risk to industry for prototyping needed innovations into rapidly emerging technologies, and by inducing collaborations beyond the scope of industry. The WP-Federation is intended to enhance participation of the broad scientific community in the implementation and governance of the EOSDIS program. By working in a community of providers and users in a WP-Federation, the WP-ESIPs will experiment with and evolve processes to make Earth system science data easy to preserve, locate, access, and use for all beneficial applications, including research, education, and commercial, many of which may cross the Federation membership.

Section 2 Science and Technical Objectives

2.0 Objectives of the Federation and the CAN

This CAN solicits, as WP-Federation members, Type 2 WP-ESIPs which will produce and publish/distribute environmental information and/or provide associated user services in support of Earth system science, and which will demonstrate in a working prototype context new and emerging information systems technologies. The Type 2 WP-ESIPs must address science information and/or services provision, user support for broad or targeted Earth system science research communities, and technology. Type 2 ESIP Working Prototypes will provide enhancement of Earth system science support and development and demonstration of technologies that will enhance the evolution of EOSDIS. Selected proposers are expected to participate as members of an environmental information WP-Federation. The WP-Federation and Type 2 WP-ESIPs experiment undertaken through this CAN (and its companion CAN for Type 3 ESIPs) will provide information on what cost savings are achievable through this approach to environmental data support.

The following subsections identify objectives for the WP-Federation and for each of the targeted foci of the Type 2 WP-ESIPs, which are discussed in the Preface remarks.

2.1 Objectives for Enhancement of Earth System Science Research and Applications

- Design reliable and useful data sets by linking the production closely to scientific drivers, applications, or analyses,
- Increase and improve the number, type, and variety of environmental information products available to the Earth system science and applications research community,
- Enhance the data quality of climate and global change related environmental data sets to be made available by the identification and removal of random and systematic errors from the data sets, as far as is possible,

- Provide a means to make available advanced algorithms for a limited area or time period or targeted algorithms for specific applications to test feasibility for widespread production,
- Enable the progression of Earth system science and applications through prototyping the facilitation of suites of data sets from multiple ESIPs to address specific interdisciplinary or boundary science questions. The term ESIPs for this purpose includes Type 2 and Type 3 WP-ESIPs, NASA DAACs, and any other data providers necessary to address the specific question.

2.2 Objectives for Technologies

- Enhance innovation and creativity in the provision of environmental information services,
- Identify and test new or emerging information technologies, techniques and/or approaches which offer promise of significantly reducing the future costs of EOSDIS,
- Preserve or enhance functionality of EOSDIS via functionally equivalent services for lower cost,
- Format data sets and associated documentation in a form suitable for transmission to permanent libraries or archives.

2.3 Objectives for the Working Prototype Federation

- Develop an enterprise model to facilitate innovative, multi-source product location, availability and usability,
- Provide easy location of, access to, and utilization of data from multiple WP-ESIPs,
- Provide user services to a large, diverse user community, encouraging collaborative analysis and research,
- Identify merits of and/or difficulties in collaboration among autonomous WP-ESIPs as lessons for the future implementation of ESIPs within EOSDIS,
- Participate in the evolution of the WP-Federation, e.g. governance structure.

2.4 Objectives for Long-term Cost Reduction

- Reduce costs to NASA to those consistent with the marginal cost of providing actual services by WP-ESIPs, since proposing organizations may have resources to share,
- Hasten future cost reduction in and availability of needed data system technologies to enhance EOSDIS evolution and to provide the instantiation of an Environmental Information Economy within the National Information Infrastructure, through technology prototyping accompanied by innovative development techniques.

Section 3 Cost Drivers in EOSDIS

Technology developed by Type 2 WP-ESIPs may migrate into future Type 1 ESIPs, which are expected to be competitively-selected NASA contracts. Presently in EOSDIS, the development and operations of the components for science data processing, archiving, and data distribution are the highest cost elements. To derive the maximum gain in cost reduction through the area of enhancing EOSDIS evolution and providing the instantiation of an Environmental Information Economy, the key cost drivers requiring innovations that lead to reduced costs are given in Appendix E. (See Appendix B, Subsection 1.7 Rights in Data.)

Section 4 Working Prototype Federation

4.1 WP-Federation Challenges

The NRC (see references in Appendix F) has identified several issues of federation that have yet to be resolved. Some of the challenges and issues identified by the NRC were: management of collaboration in a competitive environment, including effective collaboration and scheduling mandated by data set interdependencies; intellectual leadership within a decentralized system, e.g. for standards definition; governance avoiding top-down centralized management; sensitivity during transition to international partners' expectations; possible savings in costs through reassessment and relaxation of system performance and reliability requirements; and the continued viability of the Internet.

NASA MTPE will facilitate the governance of the WP-Federation, but does not plan to centrally manage the federation of collaborating entities, which must be able to expand. (See Appendix B, Section 1.1 for a description of NASA's overall planned participation.) One of the key aspects of the prototyping is to explore governance and collaboration among competing WP-ESIPs. The governing rules, organizational and technical interfaces are expected to be evolved by the WP-Federation.

Prior to the selection of the WP-ESIPs, in the July/August 1997 timeframe, the National Research Council is considering hosting a workshop on federation to discuss options for governance and other federation issues. The results of the workshop, if available, will be provided to the WP-Federation at the first implementation meeting. NASA MTPE will review the workshop results for recommendations on its facilitation of the WP-Federation experiment.

NASA plans to convene the first meeting of the WP-Federation approximately one month after the negotiation of formal Cooperative Agreements has been completed. At this meeting, the WP-ESIPs are expected to present their individual background, experience and proposed work. Among the problems confronting the WP-Federation will be to define a process for subsequent meetings, operation and decision making; and to establish ground rules for organizational interfaces and determining how and what level of system interoperability is to be achieved. NASA will make available experience, standards, and tools developed by or for EOSDIS as requested by the WP-Federation to assist in these decisions. However, it is the WP-Federation that must decide upon a consensus approach to the organizational interfaces, degree of integration and system interoperability.

NASA personnel will be made available to participate in Federation activities and will provide continuing technical coordination with EOSDIS.

4.2 Requirements for the WP-Federation

All WP-ESIPs chosen through this CAN shall participate in the WP-Federation. The purpose of the full participation of the Type 2 WP-ESIPs in an ongoing WP-Federation is to demonstrate the viability of the Federation approach to making Earth system science data easy to preserve, locate, access, and use. The focus of the WP-Federation is to establish the means which will enable the full set of WP-ESIPs to appear to users as an easily approached whole while preserving the independence, flexibility, and efficiency of the individual WP-ESIPs. The minimal set of requirements to be considered by the WP-Federation to accomplish this are given below:

The WP-Federation will be user-driven. The current EOSDIS has a large number of advisors and user committees. NASA is soliciting recommendations from the EOS Investigator Working

Group's EOSDIS Panel and from the NRC, as well as from proposers to this solicitation, concerning methodologies of user participation in the WP-Federation. As least annually, the WP-Federation will hold a User Conference. Further user involvement will be defined.

There are a variety of functions, interfaces, and services for which the WP-Federation membership will need to determine the appropriate level of standardization. These include:

- user interface
- cross-site search queries
- data formats
- metadata formats and content
- protocols for interoperability among data management systems
- data documentation
- Applications Program Interfaces (APIs)
- user services

The WP-ESIPs, acting for the WP-Federation, will be expected to develop and submit a proposal to NASA early in the first year of performance to apply for Cooperative Agreement award(s) to fund interoperability activities (see Subsection 4.3). These funds may be used for incremental developments needed to achieve the level of interoperability and/or data interuse as determined by the WP-Federation and their maintenance, and system-wide metrics collection and reporting. The WP-Federation may choose to "hire" an independent integrating organization to support these functions, in which case, the joint proposal shall reflect this approach and request the appropriate funds.

The data products and algorithms made available by all WP-ESIPs receiving funding from NASA, at a minimum, must meet all U.S. Government-mandated standards. Presently these comprise applicable Federal Geographic Data Committee (FGDC) standards.

It is envisioned that the WP-Federation will need to:

- identify and respond to needs of user community for federated services;
- implement a process for establishment, evolution, and retirement of standards to meet community needs most cost-effectively;
- adopt, adapt, and evolve prototype standards and interfaces for interoperability;
- ensure that members meet minimum EOSDIS interface standards,
- evolve an effective form of federation governance.

The members of this WP-Federation will have a collective responsibility for meeting federation-as-a-whole data and services goals and the authority to assure that Federation objectives and standards are met.

To facilitate the dissemination of any public-domain products of this CAN, the WP-ESIPs will make them available on an Internet-accessible server. (See also Appendix B, Subsection 1.7.) As a minimum, the WP-ESIPs will use the Global Change Master Directory and/or the Advertising Service provided by EOSDIS, both of which conform to FGDC metadata standards, to announce the availability of their products and services. In the cases where it is appropriate, WP-ESIPs will transfer data to long-term archives or transfer data for longer term preservation at the end of the three year performance period.

This CAN provides candidate metrics and solicits additional metrics for the measurement of WP-ESIP and WP-Federation success. The WP-Federation will deliberate on the potential metrics and propose the set of metrics to be designated for NASA concurrence.

4.3 Interoperability in the WP-Federation

Each WP-ESIP will be responsible for local implementation of whatever standards and interfaces are ultimately determined by the WP-Federation. For the purposes of proposing to be a WP-ESIP, proposers are instructed to include in their implementation plans support for one of the following System-Wide Interface Layer (SWIL) interoperability options (see Appendix B, Subsection 2.4 for specific proposal instructions; details for interoperability options can be found in the references listed in Appendix F):

1. A selection from emerging set of technologies that permit the ESIP to be automatically searched and queried from remote clients as if it is part of a larger whole (i.e., a "Federation").
2. Version 0 interoperability
3. EOSDIS Core System (ECS) interoperability
4. CEOS Catalog Interoperability Protocol (CIP)
5. Federal Geographic Data Committee (FGDC) Clearinghouse Geo Profile

Proposals will be evaluated for compliance with this requirement (see Appendix C, Section 1, Group 5), but following selection, successful WP-ESIP proposers will work with other members of the Working Prototype Federation to jointly determine and evolve these standards and interfaces.

Section 5 Schedule

The schedule for the review and selection of proposals for this CAN is as follows:

- May 8, 1997 CAN Distributed
- May 28, 1997 Preproposal Conference
- June 11, 1997 Letters of Intent Due
- July 14, 1997 Proposals Due
- October, 1997 Selection announcement

NASA will directly contact both successful and unsuccessful proposers.

Section 6 Preproposal Conference Instructions

A joint Preproposal Conference for this CAN and its companion CAN-97-MTPE-02 will be conducted prior to submission of the proposals. The objective of the conference will be to allow potential proposers the opportunity to discuss the CAN in detail. Proposers will be given adequate time to ask questions of the program management. Attendees will be provided with written responses to all questions.

The Preproposal Conference will be held in the Washington D.C. metropolitan area. The Preproposal Conference information and logistics will be available on the MTPE Home Page, at the address given below, prior to the Preproposal Conference. Please check the Home Page for details prior to attending the Preproposal Conference.

http://www.hq.nasa.gov/office/mtpe/nra.html

Section 7 General Information

Obtain additional general information:

Email: mtpe.comments@hq.nasa.gov

OR

Martha Maiden
NASA Goddard Space Flight Center
Code 170, MTPEPO
Greenbelt, MD 20546
(301) 286-0012

Appendix B Instructions for Responding to NASA Cooperative Agreement Notice

Section 1 General Instructions

1.0 Foreward

The NASA Grant and Cooperative Agreement Handbook (NPG 5800.1D dated July 23, 1996) is published as part 1260 and part 1274 of title 14 of the Code of Federal Regulations (CFR). The internet address is: http://msfcinfo.msfc.nasa.gov/rschhdbk.html. Or subscriptions (the basic edition plus all changes issued for an indefinite time) to the handbook may be purchased from the Superintendent of Documents, United States Government Printing Office, Washington, DC 20402, telephone (202) 512-1800. Requests should cite GPO Stock No. 933-001-00000-8.

1.1 NASA Participation

NASA will contribute to the partnership with Type 2 WP-ESIPs by:

- providing technical data on EOSDIS Core System development,
- providing NASA MTPE expert consultation in prototyping for specified functions, and
- providing a testbed system in which to benchmark new technical approaches.

NASA will contribute to the WP-Federation by:

- encouraging and facilitating effective 'bottoms-up' WP-Federation management,
- convening meetings of the WP-Federation as needed, and
- participating in the WP-Federation, at a minimum by facilitating two-way transfer of lessons learned from the existing EOSDIS Version 0/Version 1 Federation and the new WP-Federation.

1.2 Funding

NASA plans to fund Type 2 WP-ESIPs at an aggregate level of approximately $12 million per year. NASA's ability to fund the Type 2 WP-ESIPs selected under this CAN is contingent upon the availability of appropriated funds. It is expected that the funding for individual Cooperative Agreements will be in the range of $500K to $1.5M per year depending on the proposed activities, the proposed co-funding and the teaming arrangements. Funding for selected Type 2 WP-ESIPs will be for up to three years, and will not be directly renewable.

Educational institutions and other non-profit organizations are encouraged to propose cost sharing. For commercial firms, a substantial resource contribution (at least 50% of the total resources) is required. Cost sharing for educational institutions and other non-profit organizations is addressed in paragraph 1260.13 (c) of the NASA Grant and Cooperative Agreement Handbook. For commercial firms, see paragraph 1274.202 (c).

1.3 Eligibility

Participation in this program is open to all categories of domestic organizations including NASA centers and other government agencies. It is also open to international organizations on a no-exchange-of-funds basis. NASA funding will not be provided to other government agencies to fulfill their legislatively mandated requirements.

1.4 Joint Proposals

Joint proposals that demonstrate effective partnerships or cooperative arrangements among institutions and among the government, non-profit and commercial sectors are encouraged. (See Section 1274.202 of the NASA grant and Cooperative Agreement Handbook for a discussion of consortium arrangements.)

1.5 Letters of Intent

To determine the expertise required of peer reviewers in advance and to increase the efficiency of proposal management, it is requested that all proposers submit a Letter of Intent. The letter of intent is available electronically at URL:http://www.mtpe.hq.nasa.gov/LOI/FORM.html. We urge you to use these electronic letter of intent forms unless you do not have access to Internet. In that case, we will accept a mail or fax copy sent to (202) 554-3024 with the following information:

- PL and PM names and address (including zip+ 4);
- Title of Proposal;
- Telephone number;
- Fax number;
- E-mail address and;
- A brief summary of what you plan to propose.

NASA recognizes that some adjustments may be needed for completing the final proposal. Items which may change appropriately are: proposal title, final budget request, and PL's supporting or participating. The Letter of Intent should be submitted electronically, faxed or postmarked by midnight, June 11, 1997. Mail or FAX the Letter of Intent to:

Office of Mission To Planet Earth
Creative and Innovative Working Prototype Earth Science Information Partnerships in Support of Earth System Science
CAN-97-MTPE-01
400 Virginia Ave. SW.
Suite 700
Wash D.C. 20024
(202) 554-2775 (Use only for overnight service)
FAX: (202) 554-3024

1.6 Proposal Submission Requirements and Deadline

Ten (10) copies of the proposal shall be sent to the following address.
Creative and Innovative Working Prototype Earth Science Information Partnerships in Support of Earth System Science
CAN-97-MTPE-01
400 Virginia Ave. SW.
Suite 700 Wash D.C. 20024
(202) 554-2775 (Use only for overnight service)
FAX: (202) 554-3024

Foreign proposers should submit an additional copy to:
Office of External Relations
Mission to Planet Earth Division, Code IY
300 E Street, SW
NASA Headquarters
Washington, DC 20546
USA

Proposals must be received by 4:30 p.m. on July 14, 1997.

1.7 Rights in Data

To meet the objectives of this program, scientific data product algorithms and data products or services produced through the program shall be made available to the user community on a non-discriminatory basis, without restriction, and at no more than the marginal cost of fulfilling user requests.

A primary objective of this program is to facilitate the enhancement of the National Information Infrastructure to effect the emergence of an Environmental Information Economy capable of providing for the routine exchange of environmental data and information. Proposals for cooperative agreements should include appropriate data rights provisions with this purpose in mind. The ability to use, copy, distribute and modify software which is produced under this program by the government and the public to the extent necessary for legitimate government purposes is a possible process to enable this purpose. In general, rights in data allocation may be tailored to fit the nature of the specific cooperative agreement and the contributions of the several parties.

1.8 Withdrawal

Proposals may be withdrawn by the proposer at any time. Offerers are requested to notify NASA if the proposal is funded by another organization or of other changed circumstances which dictate termination of evaluation.

1.9 Foreign Participation

NASA accepts proposals from entities outside the U.S. in response to this CAN on a no-exchange-of-funds basis. Proposals from non-U.S. entities should not include a cost plan. Non-U.S. proposals and U.S. proposals that include non-U.S. participants, must be endorsed by the government agency or funding/sponsoring institution in the country from which the non-U.S. participant is located. Such endorsement should indicate that if the proposal is selected, sufficient funds will be made available by the sponsoring foreign agency to undertake the activity proposed.

NASA gives notice to non-U.S. organizations that already have agreements with NASA involving data system interoperability with EOSDIS that these agreements remain in force. Further, foreign organizations are not required to respond to this CAN in order to participate in cooperative efforts with NASA. This solicitation is for relationships to specifically help develop a working prototype for the EOSDIS Federation without disturbing other activities.

1.10 Cancellation of CAN

NASA reserves the right to make no awards under this CAN and, in the absence of program funding or for any other reason, to cancel this CAN by having a notice published in the Commerce Business Daily. NASA assumes no liability for canceling the CAN or for anyone's failure to receive actual notice of cancellation.

Section 2 Proposal Contents

2.0 Proposal Instructions

Each proposal copy shall contain all submitted material, including a copy of the transmittal letter. The proposals shall have a fully completed and signed cover page and certifications, as enclosed in Appendix D. When completing the prefatory forms, please note that for proposals in response to CANs, NASA recognizes only one Project Lead (PL) for each proposal. Other investigators are designated Project Members (PMs), even if their contributions to the proposal and responsibilities are comparable to that of the PL.

The proposer's sponsoring institution shall endorse all proposals. Only properly endorsed proposals are acceptable. The cover page contains space for this endorsement by an institutional representative authorized to legally bind the institution to perform the proposed effort. If substantial collaborations with other institutions are involved, then letters of endorsement shall be submitted by the responsible officials from those institutions. Each endorsement letter shall indicate agreement with the nature of the collaboration detailed in the proposal, which shall be identified by title and date of submission. All endorsement letters shall refer to the " Creative and Innovative Working Prototype Earth Science Information Partnerships in Support of Earth System Science ", CAN-96-MTPE-01.

Proposals shall contain:

- Transmittal Letter (Subsection 2.2)
- Cover Sheet (Appendix D, Subsection 1.1)
- Table of Contents
- Abstract (Subsection 2.3)
- Project Description (Subsection 2.4)
- Participation in the WP-Federation (Subsection 2.5)
- Metrics (Subsection 2.6)
- Management Approach (Subsection 2.7)
- Personnel (Subsection 2.8)
- Proposed Costs (Subsection 2.9 and Appendix D, Subsection 1.5)
- Cooperative Agreement Payment Schedule (Subsection 2.10)
- Statement of Current and Pending Support (Subsection 2.11)
- Special Matters (Subsection 2.12)
- Certification Regarding Debarment, Suspension, and Other Responsibility Matters (Appendix D, Subsection 1.2)
- Certification Regarding Drug-Free Workplace Requirements (Appendix D, Subsection 1.3)
- Certification Regarding Lobbying (Appendix D, Subsection 1.4)

Proposals are expected to be written concisely in English to minimize the burden on the reviewers and to facilitate the overall evaluation process. The total length of proposal excluding cover page, prefatory material, and list of references shall not exceed 30 pages of 8.5" x 11" paper, with a maximum of 52 lines per page (point size 12 or larger, with 1-inch margins). Proposals using type smaller than 12 points, compressed type, or less-than normal leading (space between lines), which makes reading difficult, will be returned unreviewed.

Review panels will schedule reviews based on 30 pages of technical material per proposal. Technical and resource reviewers will be instructed to consider the first 30 pages of technical material only.

To facilitate the recycling of shredded proposals after review, proposals shall be submitted on plain, white paper only. This precludes the use of cardboard stock, plastic covers, colored paper, and binders such as 3-ring, GBC, spiral, plastic strips, etc.

2.1 Restriction on Use and Disclosure of Proposal Information

It is NASA policy to use information contained in proposals for evaluation purposes only. While this policy does not require that the proposal bear a restrictive notice, offerers or quoters should, in order to maximize protection of trade secrets or other information that is commercial or financial, and confidential or privileged, place the following notice on the title page of the proposal and specify the information subject to the notice by inserting appropriate identification, such as page numbers, in the notice. In any event, information (data) contained in proposals will be protected to the extent permitted by law; but, NASA assumes no liability for use and/or disclosure of information not made subject to the notice.

NOTICE

Restriction on Use and Disclosure of Proposal Information

> The information (data) contained in [insert page numbers or other identification] of this proposal constitutes a trade secret and/or information that is commercial or financial, and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offerer, be used or disclosed other than for evaluation purposes; provided, however, that in the event a grant or cooperative agreement is awarded on the basis of this proposal, the Government shall have the right to use and disclose this information (data) to the extent provided in the grant or cooperative agreement. This restriction does not limit the Government's right to use or disclose this information (data) if obtained from another source without restriction.

2.2 Transmittal Letter Requirements

The transmittal letter shall contain the following information:

a) The legal name and address of the organization and specific division or campus identification, if part of a larger organization;

b) A brief, scientifically valid project title intelligible to a scientifically literate reader and suitable for use in the public press;

c) Type of organization; e.g., profit, nonprofit, educational, small business, minority, women-owned, etc.;

d) Name and telephone number of the Project Lead and business personnel who may be contacted during evaluation or negotiation;

e) Identification of any other organizations that are currently evaluating a proposal for the same effort;

f) Identification of the specific CAN, by number and title, to which the proposal is responding (CAN-96-MTPE-01);

g) Dollar amount requested of NASA, desired starting date, and duration of project;

h) Date of submission;

i) Signature of a responsible official or authorized representative of the organization, or any other person authorized to legally bind the organization.

2.3 Abstract

Include a concise (200-300 words) abstract describing the objective of the proposed effort and the method of approach.

2.4 Project Description

The project description shall contain a detailed description of proposed effort focused on the CAN objectives. Specific areas which should be addressed in the project description are listed below.

1) Relevance of the environmental data and information and/or associated services to be provided -- this section shall include a description of new or enhanced data sets, products, and/or services, and a discussion of how they will support and enhance Earth system science research and their relevance to the goals and objectives of this CAN (as discussed in Appendix A).

2) Innovative approaches for data production, distribution, and user support -- the proposal shall discuss the innovative technologies and approaches which are intended to be demonstrated by the WP-ESIP. A key part of the discussion on innovative approaches should be the cost benefits obtainable through the application of the new technology and the applicability of the technology for use in large science data centers.

3) Earth system science user support -- the proposal shall outline the approaches taken for support of Earth System Science users. The proposers shall identify any specific user community targeted and how the unique products and services the WP-ESIP will provide will support this community. The proposal must also address the distribution and availability of data products for the greater Earth system science community.

4) Approach to interoperability -- the proposers shall discuss the approach the WP-ESIP will take to WP-Federation interoperability and the expected significance of the approach taken. This section should address the criteria by which the proposers would select from the options for interoperability indicated in Subsection 4.3 of Appendix A. Proposers should demonstrate knowledge of their recommended interoperability option by describing the reason for their selection and how it would assist them to better serve their targeted users and to be able to make a stronger contribution as a member of the Federation as a whole.

2.5 Participation in the WP-Federation

A major purpose of this CAN is to experiment with management and technical approaches for cost-effectively providing data services to a diverse user community through cooperating, autonomous

data centers. In addition to providing new scientific products, prototyping technology and meeting their individual user data needs, each WP-ESIP will be expected to participate fully as a member of the WP-Federation (see Appendix A, Section 4).

Each WP-ESIP proposal shall address their expected participation in the WP-Federation. Proposers should address the Federation objectives detailed in Appendix A and how their participation to the WP-Federation addresses and will contribute to these objectives.

2.6 Metrics

The proposals shall address metrics for measuring the performance of the individual WP-ESIPs and the Federation as a whole. Each proposal shall discuss the establishment of a set of metrics for measuring the performance of their local WP-ESIP for the four areas listed in Subsection 2.4 of this appendix. The proposals shall show how the contributions of the individual WP-ESIPs to the success of the Federation are measured. Candidate metrics are indicated below. NASA solicits input from proposers to identify additional potential metrics for the WP-Federation.

2.6.1 Federation Metrics

- Identify and enumerate existing obstacles to making data easier to find, access and use and develop metrics to measure removal of obstacles. (Goal: to measure success of the Federation in improving data access and use.)

- Identify user community types, identify services required per community, enumerate those services, and develop metrics to measure total services provided to the community. (Goal: To measure success of the Federation in providing services required by a large, diverse user community.)

- Identify users' needs for timely delivery of data products, and compare the achieved timeliness with the users' needs. (Goal: To measure success of the Federation in meeting users' needs for products in a timely manner.)

2.6.2 Earth System Science Metrics

- Develop metrics for usefulness of new products to specific user community, and speed of responsiveness to user community for introduction of or improvements to new products. Develop metrics for usability of products, considering completeness and understandability of documentation and metadata. (Goal: To offer improved products and services to the Earth system science user community.)

2.6.3 Technology Development Metrics

- Develop metrics to measure the use of existing services by "end-users" (e.g., science user, programmer, operations staff) for utility, ease of use, effectivity, etc. These same metrics will be used to compare the new implementation approach of service with existing EOSDIS services (Goal: To prove equal or better functionality.)

- Define metrics showing scaleability of WP-ESIP's solution to the size and scale of EOSDIS in terms of functionality and cost. (Goal: To assess WP-ESIP prototype technology approach relevance and applicability to a full scale Environmental Information Economy.)

2.7 Management Approach

The proposer shall describe the proposed WP-ESIP management approach. For efforts involving interactions among individuals from more than one organization, plans for dissemination of responsibilities and any necessary arrangements for ensuring a coordinated effort should be described. Note that if the cooperative agreement is to be awarded to a consortium, a completed, formally executed Articles of Collaboration is required prior to award. Proposal should address how this requirement will be met. Aspects of any required intensive working relation with NASA field centers shall also be discussed.

2.8 Personnel

For each PL or PM, submit a brief biographical sketch referencing related work, along with citations of the most relevant recent publications and any exceptional qualifications covering the past 5 years. The biographical sketch and publications list shall not exceed one page per PL or PM. A summary of other participants shall not exceed one page.

The Project Lead is responsible for direct supervision of the work and participates in the conduct of the project regardless of whether or not compensation is received under the award. Omit social security number and other personal items which do not merit consideration in evaluation of the proposal. Give similar biographical information on other senior professional personnel who will be directly associated with the project. Give the names and titles of any other scientists and technical personnel associated substantially with the project in an advisory capacity. Universities should list the approximate number of students or other assistants participating in the proposed effort, together with information as to their level of academic attainment. Any special industry-university cooperative arrangements should be described.

2.9 Proposed Costs

Proposals shall contain cost and technical parts in one volume; do not use separate "confidential" salary pages. In addition to the instructions contained here, proposers are referred to Appendix D. This section contains a model format for a yearly Budget Summary and line by line instructions along with the Certification Regarding Drug Free Workplace Requirements and the Certification Regarding Debarment, Suspension, and Other Responsibility Matters required in all proposals. The Certification Regarding Lobbying is only required if the proposed budget is over $100,000.

The budget section of the proposals shall include a budget breakdown by Government fiscal year (October 1 to September 30) for each year of the proposed work.

If proposals involve collaborations with PMs who are at institutions different from that of the PL, and those PMs require funding support, the budget total of each participating institution shall be listed under category "3.a. Subcontracts" in the Proposal Budget Summary of the PL. Details of the budgets of such participating institutions shall be provided separately.

Describe available facilities and major items of equipment especially adapted or suited to the proposed project, and any additional major equipment that will be required. Identify any Government-owned facilities, industrial plant equipment, or special tooling that are proposed for use on the project. Before requesting a major item of capital equipment, the proposer should determine if sharing or loan of equipment already within the organization is a feasible alternative to purchase. Where such arrangements cannot be made, the proposal should so state. Title and disposition of equipment purchased with Government funds will be determined for each

cooperative agreement depending upon the nature of the recipient (i.e., nonprofit or profit making company) and other factors.

Costs of mandatory participation in the WP-Federation should be included in the costs. These costs include site implementation of the determined approach to the organizational interfaces; implementation and maintenance of system-wide requirements, standards and protocols; and work to be performed by the WP-ESIPs to interact with each other (e.g. meetings and telecons). Since the selected WP-ESIPs will propose as a group for the funds for the development and/or adaptation of the selected System-Wide Interface Layer (SWIL) and associated interoperability activities, proposals should not include these estimated costs in their proposed budgets.

2.10 Cooperative Agreement Payment Schedule

Proposers shall provide a schedule of payment milestones. Performance-based milestones spread throughout the three-year award period must be proposed. Milestones must signify verifiable events as opposed to the passage of time. Meaningful milestones should be based on provision of science information and/or services, user support, the development and demonstration of technologies, and in the WP-Federation evolution. Team payments will be based upon completion of milestones. Milestone payments will be finalized during negotiations of formal Cooperative Agreements.

2.11 Current and Pending Support

Following the budget section, the proposal shall contain a summary of current and pending Federal support of all projects with substantial involvement of the PL and each PM for whom support is requested. The information content shall include: source of support, project title with grant or contract number, award amount by Government fiscal year, and total award amount, award period, level of effort in person-months, and the location where the work is to be performed.

2.12 Special Matters

Include any required statements of environmental impact of the work, human subject or animal care provisions, conflict of interest, or on such other topics as may be required by the nature of the effort and current statutes, executive orders, or other current Government-wide guidelines.

Proposers should include a brief description of the organization, its facilities, and previous work experience in the field of the proposal. Identify the cognizant Government audit agency, inspection agency, and administrative contracting officer, when applicable.

All commercial awardees will be subject to terms and conditions under NASA Grant and Cooperative Agreement Handbook, Part 1274, Sections 901 through 932 and Appendices A through C (See Appendix G for handbook reference.), unless otherwise indicated in this CAN, when Cooperative Agreements are negotiated after notification of selection. Offerers should pay careful attention to these referenced provisions and conditions and indicate in their proposal if they take exception to any of these terms and conditions.

Appendix C Proposal Evaluation

Section 1 Evaluation Factors

The following five factors will be used to evaluate proposals. Factors 1 through 5 are rated equally. Within each factor, the points to be considered during evaluation are listed.

Factor 1: The nature and quality of the contribution to Earth system science and applications research.

- The overall technical merit of the proposed science products and services, including their relevance to the overall goals and objectives of MTPE and the ability to meet identified needs of the broad or a targeted segment of the Earth system science research community.

- The competence and relevant experience of the proposed Earth system science researchers included on the team as an indication of their ability to carry the proposed activity to a successful conclusion.

- The degree of understanding of the targeted user community and their requirements as documented in the proposal.

- The likely flexibility and responsiveness of the proposed WP-ESIP to changing user needs as evidenced by the discussion of the approach to this issue in the proposal.

Factor 2: Stimulation and support of focused research and technology/technique development in information systems that increase the performance to cost efficiency of Earth system science data and information system support.

- Innovation -- Proposals will be evaluated for the degree of innovation in the technology or techniques proposed to enable the implementation of a broadly-based Environmental Information Economy, and for the ability to enable the evolution of EOSDIS to a full cost-effective Federation.

- Potential for Achieving Cost Reductions -- Proposals should demonstrate the proposer's plans to support the implementation of components critical to the enhanced evolution of EOSDIS and/or instrumental in effecting an Environmental Information Economy making a broadly-based federation cost-effective. Claims of potential cost reductions should be clearly stated and should be substantiated to the extent possible, with supporting analysis indicating scaleabilty and applicability to a full EOSDIS federation.

- Technical Approach -- Proposals will be evaluated for the relevance and merit of the technical approach proposed to achieve evolution-based prototypes. Proposals will be evaluated to assess the proposed milestones and the probability that the proposer's collaborative research activities will meet these milestones. Key personnel that the proposer plans to employ in the research are also a key element for this point. In addition, a key element of the evaluation is an assessment of proposer's efforts to support the transfer of technology to an EOSDIS federation directly or via fostering the movement of research into the commercial marketplace. The degree of collaborative research proposed, the nature of proposed alliances with Government,

academia, and industry to accomplish this end will be evaluated together to determine the overall benefit including the broader Federation.

- Past Performance -- Proposals will be evaluated to determine the proposer's experience, expertise, and past performance in:

    1. The area of applicable technologies, specifically involving the proposed research;
    2. Researching, designing, developing, testing, and producing related hardware and/or software systems and applications; and
    3. Commercializing such systems and applications where appropriate or otherwise transitioning them to operational use.

Factor 3: Best value and cost.

- The value to the Earth system science research community of the proposed partnership relative to its costs.

- The extent of cost sharing in the proposed partnership and the nature and reliability thereof.

- Cost realism of the proposed budget, particularly as an indication that proposers understand the nature of the proposed partnership.

- Total cost to NASA.

Factor 4: The practicality and likely effectiveness of the proposed activities.

- Adherence to good management practices as exhibited in the management approach including clear identification of the broad or targeted user community to be served, any user fees to be charged, and the appropriateness of any user fees.

- The soundness of the implementation for production and publishing/distribution functions and the user services approach, including mechanisms for continued interaction with the broad or targeted segment of the Earth system science research community on product and service enhancements.

- The degree of understanding of scientific data management issues.

- The general commitment and support of the proposing institution(s) for this activity and for on-site(s) Earth system science research and the quality, appropriateness and extent of collocated research using the data and information to be produced and/or published by the proposed WP-ESIP. Alternatively, the proposers may demonstrate how their teaming arrangements with remotely located partners can result in effective and practical collaboration with researchers using appropriate technology. The adequacy of the facilities, staffing, and equipment to support the proposed activity.

- The adequacy of metrics and other statistics to be collected and reported to measure the success of the activity against its stated objectives.

Factor 5: The nature and quality of the understanding of the benefits and issues associated with NASA MTPE plans to shift its implementation of EOSDIS production, publishing/distribution, and user services to a federation of ESIPs.

- Potential for Success of Working Prototype Federation -- Proposals will be evaluated on the merits of the ideas for participation in the Working Prototype Federation with other WP-ESIPs to meet the broader objective of the Federation as a whole. This may include teaming arrangements with appropriate members from the user community to ensure the broader community representation on the Federation.

- Understanding of System Interoperability -- Proposals will be evaluated for knowledge of and competent justification of the recommended interoperability option, as chosen from candidates enumerated in Appendix A, Subsection 4.3.

Section 2 Evaluation Process

Proposals will be selected following scientific review by discipline specialists in the area of the proposal, technical review by technology or technique innovation area specialists, and evaluation of management and costs. The final decisions will be made by a designated NASA selecting official. NASA reserves the right to make judgments during final project selection based on programmatic factors, including the overall balance of viable proposals across Earth system science disciplines and across technology and technical innovation areas. This means that the set of projects will be chosen with thought to the balance and importance of the eventual products/services and the overall contribution of the WP-ESIPs to the entire user community.

Appendix D CAN Proposal Forms

1.1 Proposal Cover Sheet(s) and Instructions

Cooperative Agreement Notice CAN-97-MTPE-01

Proposal No. _____ (Leave Blank for NASA Use)

Title: _____

Project Lead:

Name: _____

Department: _____

Institution: _____

Street/PO Box: _____

City: _____ State: _____ Zip: _____

Country: _____ E-mail:_____

Telephone: _____ Fax: _____

Name . . . . . Institution . . . . . Telephone . . . . . Email
Project Members:
_____ _____ _____
_____

_____ _____ _____
_____

Other Named Individuals:
_____ _____ _____
_____

_____ _____ _____
_____

Funding Profile:

1st Year:	Science	Tech Development	Operations	Total
Requested of NASA	_____	_____	_____	_____
Cost Share (if any)	_____	_____	_____	_____
1st Year Total	_____	_____	_____	_____
2nd Year:	Science	Tech Development	Operations	Total
Requested of NASA	_____	_____	_____	_____
Cost Share (if any)	_____	_____	_____	_____
2nd Year Total	_____	_____	_____	_____
3rd Year:	Science	Tech Development	Operations	Total
Requested of NASA	_____	_____	_____	_____
Cost Share (if any)	_____	_____	_____	_____
3rd Year Total	_____	_____	_____	_____

Cumulative (3 years):	Science	Tech Development	Operations	Total

Requested of NASA	_____	_____	_____	_____
Cost Share (if any)	_____	_____	_____	_____
Cumulative Total	_____	_____	_____	_____

Relevant Earth System Science Category(s):_____

Area(s) of Technology/Technique Innovation:_____

Authorizing Official:

(Name)_____ (Institution)_____

Proposal Cover Sheet Instructions

The information you provide on this cover sheet will be used to create a unique data record about your proposal. This information will be used for tracking, review, evaluation, and all correspondence with you and your institution. Please ensure that the data listed here are in complete agreement with any similar information appearing elsewhere in your proposal.

This required information should be listed in the following order:

Project Lead Information (Title, Name, Full Address, Phone, Fax, and Email)

Project Member Information (Title, Name, Institution, Phone, and Email)

Other Named Individuals, if applicable (Title, Name, Institution, Phone, and Email)

If your proposal identifies other named personnel or collaborators who would be participating in the proposed activities, you must include contact information for them (regardless of whether funding for these individuals is requested). This information will be used to avoid conflicts of interest during the review and evaluation process.

Funding Profile:

Show funding profile by year, by the following categories. 1) Science algorithm and product development, 2) Technology development, 3) Operations. Also, break out funding profile by funding requested of NASA, and proposed cost share.

These may be reasonable estimates of allocations if costs are shared. If joint project with multiple institutions, show breakouts by group and total cost per period.

Relevant Earth System Science Categories (list all of the following which apply to your proposal)

Land-Cover and Land-Use Change Research, Seasonal-to-Interannual Climate Variability and Prediction, Natural Hazards Research and Applications, Long-term Climate: Natural Variability and Change Research, Atmospheric Ozone Research

Area of Technology/Technique Innovation As Outlined in Appendix E (list all of the following which apply to your proposal)

Operations of multiple distributed sites, Distributed sustaining engineering across multiple sites, User services across distributed sites, Data set acquisition and mission support, Science data archival storage, Planning and data processing subsystem COTS hardware, Planning and processing software development, Distributed systems management, Distributed computing Middleware, Data access, Other (please specify)

1.2 Certification Regarding Debarment, Suspension, and Other Responsibility Matters Primary Covered Transactions

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 34 CFR Part 85, Section 85.510, Participant's responsibilities. The regulations were published as Part VII of the May 26, 1988 Federal Register (pages 19160-19211). Copies of the regulation may be obtained by contracting the U.S. Department of Education, Grants and Contracts Service, 400 Maryland Avenue, S.W. (Room 3633 GSA Regional Office Building No. 3), Washington, DC. 20202-4725, telephone (202) 732-2505.

(1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statues or commission of embezzlement theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) Have not within three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

(2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

_____

Organization Name PR/Award Number or Project Name

_____

Name and Title of Authorized Representative

_____

Signature

_____

Date

ED Form GCS-008 (REV.12/88)

1.3 Certification Regarding Drug-Free Workplace Requirements
Grantees Other Than Individuals

This certification is required by the regulations implementing the Drug-Free Workplace Act of 1988, 34 CFR Part 85, Subpart F. The regulations, published in the January 31, 1989 Federal Register, require certification by grantees, prior to award, that they will maintain a drug-free workplace. The certification set out below is a material representation of fact upon which reliance will be placed when the agency determines to award the grant. False certification or violation of the certification shall be grounds for suspension of payments, suspension or termination of grants, or government wide suspension or debarment (see 34 CFR Part 85, Sections 85.615 and 85.620).

This grantee certifies that it will provide a drug-free workplace by: (a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition; (b) Establishing a drug-free awareness program to inform employees about -

1. The dangers of drug abuse in the workplace;
2. The grantee's policy of maintaining a drug-free workplace;
3. Any available drug counseling, rehabilitation, and employee assistance programs, and
4. The penalties that may be imposed upon employees for drug abuse violations in the workplace;

(c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a); (d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will -

1. Abide by the terms of the statement; and
2. Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after such conviction;

(e) Notifying the agency within ten days after receiving notice under subparagraph (d)(2) from an employee or otherwise receiving actual notice of such conviction; (f) Taking one of the following actions, within 30 days of receiving notice under subparagraph(d)(2) , with respect to any employee who is so convicted -

1. Taking appropriate personnel action against such an employee, up to and including termination; or
2. Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;

(g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraph (a), (b), (c), (e), and (f).

_____

Organization Name PR/Award Number or Project Name

_____

Name and Title of Authorized Representative

_____

Signature

_____

Date

ED 80-0004

1.4 Certification Regarding Lobbying

Certification for Contracts, Grants, Loans, and Cooperative Agreements.

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000, and not more than $100,000 for each such failure.

Signature and Date

Name and Title of Authorized Representative

Organization Name

1.5 Budget Summary and Line by Line Instructions

BUDGET SUMMARY
199x

	NASA Funding	Cost Share	199x Total	CUMULATIVE TOTAL
1. Direct Labor (salaries, wages, fringe benefits)				
2. Total Direct Labor Hours				
3. Other Direct Costs:				
a. Subcontractors				
b. Consultants				
c. Equipment				
d. Supplies				
e. Travel				
f. Other				
4. Indirect Costs, Including Percent				
5. Other Applicable Costs				
6. Total Costs				

Budget Summary Line by Line Instructions

For each year of proposed work, complete a Budget Summary Sheet. In the first column, complete line by line instructions below for budget requested from NASA. In the second column, similarly enter the amount of cost sharing proposed, if any. The third column should contain the total annual project budget, and the fourth column the project budget cumulative total. Provide in attachments to the budget summary the detailed computations of estimates in each cost category, along with any narrative explanation required to fully explain proposed costs.

1. Direct Labor (salaries, wages and fringe benefits): Attachments should list number and titles of personnel, amount of time to be devoted to the effort and hourly rates of pay.

2. Total Direct Labor Hours: Show total number of estimated labor hours required to accomplish the task.

3. Other Direct Costs:

a. Subcontractors - Attachments should describe the work to be subcontracted, estimated amount, recipient (if known), and the reason for subcontracting this effort.

b. Consultants - Identify consultants to be used, why they are necessary, time to be spent on the project, and rates of pay (not to exceed the equivalent of the daily rate for GS-18 in Federal service: $429 per day as of January 12, 1992, excluding expenses and indirect cost).

c. Equipment - List separately and explain the need for items of equipment exceeding $1,000. Describe the basis for the estimated cost. General-purpose, non-technical equipment is not allowable as a direct cost to NASA Cooperative Agreements unless specifically approved by the Contracting Officer.

d. Supplies - Provide general categories of needed supplies, the method of acquisition, estimated cost, and the basis for the estimate.

e. Travel - List proposed trips individually, describe their purpose in relation to the grant, provide dates, destination, and number of travelers where known, and explain how the cost for each was derived.

f. Other - Enter the total of any other direct costs not covered by 3a through 3e. Attach an itemized list explaining the need for each item category and the basis for the estimate.

4. Indirect Costs: Identify indirect cost rate(s) and base(s) as approved by the cognizant Federal agency, including the effective period of the rate. If unproved rates are used, explain why and include the computational basis for the indirect expense pool and corresponding allocation base for each rate. Provide the name, address, and telephone number of the Federal agency and official having cognizance over such matters.

5. Other Applicable Costs: Enter the total of any other applicable costs. Attach an itemized list explaining the need for each item and the basis for the estimate.

6. Total Estimate Costs: Enter the sum of items 1, 3.a, through 3.f, 4, and 5.

Appendix E Potential Areas for Innovations: to Reduce Costs to EOSDIS and to Develop the Environmental Information Economy

This Appendix identifies potential areas where innovations in technologies and techniques may reduce long-term costs. The areas are listed in descending order of costs in the science processing and data management component of EOSDIS. These are not necessarily exhaustive, but are included here as areas to be considered by the proposers for new technology demonstration.

Operations Cost Elements

• Operations of multiple distributed sites:

The cumulative costs associated with operating multiple distributed sites require innovations in toolsets or techniques to introduce efficiencies. Areas where non-traditional techniques or toolsets may reduce overall operations costs are:

1. Cumulative site and multi-site resource planning, performance analysis, trending analysis, and overall system administration.
2. Production operations
3. Archive operations
4. Ingest operations*
5. Interoperability and data management operations*.

*The last two areas are not significant in cost, but are included here for completeness.

• Distributed Sustaining Engineering Across Multiple Sites

The cumulative costs associated with maintaining multiple distributed sites' hardware and software, both commonly held and site-unique, may be amenable to innovations in toolsets or techniques to introduce efficiencies. Non-traditional mechanisms supported by innovative distributed maintenance toolsets may reduce overall operations costs. Areas where new techniques or toolsets may provide efficiencies are as follows:

1. Distributed configuration management
2. Distributed techniques to analyze remote system exceptions, with remotely enabled system upgrade techniques.

• User Services Across Distributed Sites

Support for a very large and very diverse user community incurs cumulative costs that may be amenable to innovative new techniques for reducing labor associated with that support, while maintaining high levels of user satisfaction. Areas that are amenable to innovation include:

1. Efficiencies in maintaining required metadata and support documentation required for effective data usage by the broad user community, while providing a coherent level of service for users of multiple sites and sources of data.
2. Efficiencies in support for the broad community in assisting their use of multiple heterogeneous data systems and in effectively using heterogeneous data organizations (e.g. formats, documentation, semantics).
3. Prioritization of user requests based on a predetermined or dynamic scheme

• Data set Acquisition and Mission Support

Data center support for missions producing new data products and data center support for acquiring data from sites where the data management function may have been lacking incur labor costs to analyze and encourage effective data management (i.e. adequate documentation, formats accessible by read software, adequate metadata generation). Innovations in toolsets to ease the original production of the needed documentation, metadata, and formats can help to lower costs of preserving data for long term usage.

1. Toolsets to automate user support for transfer of data from producer sources to an active archive, including automated generation of metadata based on Earth-science object types.
2. Toolsets that use aids such as intelligent data management techniques that encode data management expertise while not requiring the presence of the actual data manager.

Development Cost Elements

Highest major development costs in the science processing and data management component of EOSDIS are for system functions that produce and store standard products in a reliable and timely manner. The second highest development costs are needed for components shared between the production and distribution functions (e.g. COTS hardware and software for staging storage, infrastructure development for systems management, etc.) And, finally, development associated with data access are relatively lower costs (e.g. client access to request satellite acquisition of data, search, browse and select for order of already archived data, etc.) A more detailed description of these cost elements in order of most to least cost is described below.

- Science data archival storage

Improvements in physical hardware required for storage of large volumes of science data, and improvements in software approaches to efficient organization and access of that data. Specifically:

1. High-capacity storage systems, system integration of off-the-shelf tape and optical technologies and enhancements;
2. Data organization schemes that ensure optimum file access based on user access patterns;
3. Scaleable file storage and management systems including examination of how storage hardware and storage management software scale to EOSDIS data volumes;
4. Concepts for storage of information, for example, storage as database objects versus storage as individual files;
5. Concepts for information stewardship, for example, techniques and standards for storing low-level file metadata, for documenting science or compression algorithms, and for interpreting data structures;
6. System wide techniques for compression and decompression of files, objects, and databases;
7. System techniques to optimize data flow demand supporting complex production and distribution management for efficient access to data and a reduction of costs associated with staging disks. (These are costs shared between production and distribution but are included here for brevity.)

- Planning and Data Processing Subsystem COTS hardware

Innovations are needed in better or more efficient approaches for the production of data sets to reduce long-range processing hardware costs. These approaches include:

1. Parallel or distributed computing platforms supported by software development environments automating code optimization
2. Efficiency of algorithms

3. Optimization techniques as relates to processing of data
4. Automatic failover features.

• Planning and processing software development

Innovations are needed to address issues related to the efficient staging of data for processing, and effectively extracting information from large amounts of scientific data. Specific areas include:

1. Concepts for representing potential products via virtual metadata, addressing issues such as product visibility, acceptable generation times, selected production of minimum acceptable amounts, and notification for products that cannot be generated;
2. Rationale for use of on-demand processing versus routine generation and storage of products;
3. Approach for automated population of a data repository covering data type, structure, processing history, version, production notes, etc.;
4. More efficient processing algorithms;
5. Concepts for spatial data projections to facilitate processing for interuse of multi-source datasets and interdisciplinary research and analysis.

• Distributed Systems Management

Distributed system component systems management and resource management techniques for large numbers of hosts, (e.g., 500) including:
1. Accounting
2. Security
3. Monitoring
4. COTS usage associated with these functions

• Distributed Computing Middleware

Efforts in this area should provide tools, techniques, and standards to support the development and management of distributed Earth science information systems. Solutions proposed for any of these areas should be directly applicable to Earth science data systems, and should address issues specific to these systems (e.g., support for large data flows). Specific areas in which innovations are needed include:

1. Middleware for distributed systems capable of supporting large data flows in a distributed object environment that is heterogeneous in terms of hardware platforms and architectures, and programming languages;
2. Management tools that support system accounting, performance monitoring, and fault management for distributed systems that span multiple enterprises, especially those that support a more virtual operations model (i.e., operations in which systems management tasks may move dynamically between distributed operations personnel) and that follow distributed systems management standards;
3. Cost-effective technologies for high performance networking, including software and hardware for wide and local area networks;
4. Integrated middleware and high performance networking.

• Data Access

Efforts in the data access area are intended to develop approaches, applications, architectures, and standards that enable or enhance user access to scientific data and information including local efficiencies and broad area access. An implicit factor in all of the below is performance. Specifically, innovations in this area include:

1. Architectures that support open-federation and value-added provider models of data and information systems (e.g. component-based architectures);
2. Portable, extensible tools based on emerging Internet data and information access technologies. Solutions in this area should address, but not be limited to, the WWW, HTML, and Java;
3. Software and data/information standards that support the integration of data access and data analysis and visualization applications. New concepts and technologies for content based pre-screening;
4. Software for bridge or gateway components that translate between different data access protocols;
5. Information models and database technologies that improve users' capabilities to analyze and interpret data sets from multiple sources;
6. Compatibility of interface protocols or development of gateways for continued extension of EOSDIS;
7. Automation of generation of metadata content by direct examination of the data and documentation archived.
8. Client software generation tools that lower the cost of development of clients tailored to science data access.

In addition, improvements in systems engineering methodologies, tools, and management techniques to increase faster “time to market” and reduce development costs are desirable. Methodologies the produce robust, evolvable software while at the same time supporting iterative requirements development by science users could be used by proposers in support of their technology development.

Appendix F References to Relevant Reports, Plans and Documents

3.0 Applicable Policies and Procedures Relating to Award and Administration of NASA Cooperative Agreements

NASA Grant and Cooperative Agreement Handbook (NPG 5800.1D dated July 23, 1996), Part 1260 of title 14 of the Code of Federal Regulations (CFR).

The internet address where this document can be found is:
http://msfcinfo.msfc.nasa.gov/rschhdbk.html.

Subscriptions (the basic edition plus all changes issued for an indefinite time) to the handbook may be purchased from the Superintendent of Documents, United States Government Printing Office, Washington, DC 20402, telephone (202) 512-1800. Requests should cite GPO Stock No. 933-001-00000-8.

3.1 National Research Council Documents

National Research Council (NRC). 1995. A Review of the U.S. Global Change Research Program and NASA's Mission to Planet Earth/Earth Observing System. National Academy Press. Washington, D.C.

National Research Council (NRC). 1996. Letter Report from Moore, Berrien III, Chair, Committee on Global Change Research and Edward A. Frieman, Chair, Board on Sustainable Development to Dr. Robert W. Corell, Chairman, Subcommittee on Global Change Research, July 3,1996.

3.2 Information on MTPE

History of EOSDIS:
NASA,1986. Report of the EOS Data Panel. NASA Technical Memorandum 87777.

NASA Response to NRC Federation recommendations:
NASA, May 1996, "Program Plan In Response to NRC Recommendations With Respect to EOSDIS"

Information on NASA's Response Task Force and Federation model:
http://www.hq.nasa.gov/office/mtpe/eosdis

The following documents can be found at http://www.hq.nasa.gov/office/mtpe/

MTPE: A Program to Understand Global Environmental Change
The Earth Observer
Science Strategy for the Earth Observing System
The Earth Observing System Reference Handbook
The NASA Technical Report Server
EOSDIS Potential User Conference Proceedings

The document Understanding Our Changing Planet: NASA's Mission To Planet Earth can be found at:
http://spso.gsfc.nasa.gov/eos_publications/fact_book/fact_toc.html

The MTPE/EOS 1995 Reference Handbook can be found at:

http://spso.gsfc.nasa.gov/eos_reference/TOC.html

The MTPE Science Research Plan can be found at:
http://www.hq.nasa.gov/office/mtpe/draftsciplan/mtpe-srp.htm

The EOSDIS Science Data Plan can be reached via common http browsers as follows:
Go to:
http://eos.nasa.gov/

Select: "Services"
Select: "Gopher Access to EOS Documentation"
Walk the tree:
EosDis
Daacs
Docs
ScienceDataPlan
SDP_1996

SDP_1996 is a directory.
Get the files within that you desire.

Alternatively, anonymous FTP can be used to get the Science Data Plan as follows:
eos.nasa.gov
EosDis/Daacs/Docs/ScienceDataPlan/SDP_1996/

3.3 Information on EOSDIS Core System

References to ECS Evolution can be found at:
http://ecsinfo.hitc.com

ECS document search services can be obtained at:
http://edhs1.gsfc.nasa.gov

3.4 URLs of Interest (Interoperability Protocol Information, Data, Sensor Descriptions, Information on Affiliated Data Systems)

Information about the CEOS Catalog Interoperability Protocol (CIP)
can be found at
http://harp.gsfc.nasa.gov/cip

Access to information on FGDC and the FGDC Clearinghouse:
http://www.fgdc.gov

Access to Version 0 EOSDIS, the DAACs and their data holdings
http://eos.nasa.gov/imswelcome

Information about setting up a Version 0 EOSDIS' Information Management System server and pointers to additional on-line documentation
http://harp.gsfc.nasa.gov:1729/eosdis_documents/server-cookbook.html

Information regarding the EOSDIS Core System can be obtained at:
http://ecsinfo.hitc.com

Links to copies of the ECS test datasets can be obtained at:
http://newsroom.gsfc.nasa.gov/eval/et3top.html
http://esdis.gsfc.nasa.gov/tdm

Information regarding the ESDIS Project at Goddard Space Flight Center,
including system architecture and technology information, can be found at:
http://eos.nasa.gov/eosdis

Appendix G Acronyms

Acronym list inclusive for this CAN and its companion, CAN-97-MTPE-02.

ACRIM	Active Cavity Radiometer Irradiance Monitor
ADP	Automated Data Processing
AHWGC	Ad Hoc Working Group on Consumers
AHWGP	Ad Hoc Working Group on Production
AIRS	Atmospheric Infrared Sounder
AMSR	Advanced Microwave Scanning Radiometer
API	Applications Program Interface
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
ATMOS	Atmospheric Observations Satellite
AVHRR	Advanced Very High Resolution Radiometer
CA	Cooperative Agreements
CAN	Cooperative Agreement Notice
CERES	Clouds and the Earth's Radiant Energy System
CFR	Code of Federal Regulations
CIP	Catalog Interoperability Protocol
CLAES	Cryogenic Limb Array Etalon Spectrometer
COARE	Coupled Ocean Atmosphere Regional Experiment
Code Y	NASA Headquarters Office of Mission to Planet Earth
COTS	Commercial Off the Shelf
CSMS	Communications and System Management Segment
DAAC	Distributed Active Archive Center
DCE	Distributed Computing Environment
DFA	Dual-Frequency Radar Altimeter
DMSP	Defense Meteorological Satellite Program
ECS	EOSDIS Core System
EOS	Earth Observing System
EOSDIS	Earth Observing System Data and Information System
ERBE	Earth Radiation Budget Experiment
ERBS	Earth Radiation Budget Satellite
ESDIS	Earth Science Data and Information System
ESIP	Earth Science Information Partner
ESSP	Earth System Science Pathfinders
ETM	Enhanced Thematic Mapper
FAR	Federal Acquisition Regulation
FGDC	Federal Geographic Data Committee
FIRE	First ISCCP Regional Experiment
GIS	Geographic Information System
GOCO	Government Owned Contractor Operated
GOES	Geostationary Orbiting Environmental Satellite
GSA	General Services Administration
HALOE	Halogen Occultation Experiment
HPPI	High Performance Parallel Interface
HRDI	High Resolution Doppler Imager
HTML	Hyper Text Markup Language
IR&D	Independent Research and Development
ISAMS	Improved Stratospheric and Mesospheric Sounder
ISCCP	International Satellite Cloud Climatology Program
Landsat	Land Remote-Sensing Satellite

LIS	Lightning Imaging Sensor
LOI	Letter of Intent
LTAA	Long Term Active Archive
MISR	Multi-angle Imaging Spectroradiometer
MLS	Microwave Limb Sounder
MODIS	Moderate-Resolution Imaging Spectroradiometer
MR	Microwave Radiometer
MTPE	Mission to Planet Earth
NASA	National Aeronautics and Space Administration
NGO	Non-Governmental Organization
NRA	NASA Research Announcement
NRC	National Research Council
OLS	Optical Line Scanner
OMB	Office of Management and Budget
OTD	Optical Transient Detector
PDPS	Planning and Data Processing Subsystem
PL	Project Lead
PM	Project Member
PR	Purchase Request
PR	Precipitation Radiometer
RTF	Response Task Force
SAGE	Stratospheric Aerosol and Gas Experiment
SBUV	Solar Backscatter Ultraviolet
Seasat	Sea Satellite
SeaWiFS	Sea-Viewing Wide Field-of-View Sensor
SMMR	Scanning Multispectral; Microwave Radiometer
SOLSTICE	Solar Stellar Irradiance Comparison Experiment
SSMI	Special Sensor Microwave Imager
SUSIM	Solar Ultraviolet Spectral Irradiance Monitor
TES	Tropospheric Emission Spectrometer
TMI	TRMM Microwave Imager
TOGA	Tropical Oceans Global Atmospheres
TOMS	Total Ozone Mapping Spectrometer
TOVS	TIROS Operational Vertical Sounder
TRMM	Tropical Rainfall Measurement Mission
UARS	Upper Atmospheric Research Satellite
URD	User Requirements Document
URL	Universal Resource Label
USGCRP	US Global Climate Research Program
V0	EOSDIS Version 0
VIRS	Visible Infrared Scanner
WINDII	Wind Imaging Interferometer
WP	Working Prototype
WP-ESIP	Working Prototype Earth Science Information Partner
WPF	Working Prototype Federation
WWW	World Wide Web